ATTENTION

Remember that the

FIRST ANNUAL IMSA PRESENTATION DAY

will take place next MONDAY

April 24, 1989

Attached is a schedule of the times and locations of the presentations.

All faculty and students are expected to attend at least one of the sessions. At the end of her talk, Rowan Lockwood will describe some of her experiences as a Westinghouse finalist.

There will be a short Awards Ceremony at 11:00 AM in the Auditorium. After that ceremony the presenters will be available for questions that couldn't be answered during the regular sessions.

First Annual IMSA Presentation Day

Monday April 24, 1989

Session AUD 1
New Ideas
Auditorium
9:00 - 9:55

9:00 - 9:15 A1 **Recent Reports of Cold Fusion**

Patrick LaMaster, IMSA

On March 23, 1989 two Chemists from the University of Utah held a press conference to announce their discovery of a room temperature fusion process. Scientists from around the world have been racing to verify the results of what some have proclaimed as one of the greatest discoveries of our time. This presentation will look at the findings put forth in the Utah fusion papers. In addition, recent verification reports as well as future implications of cool fusion will be discussed.

9:20 - 9:35 B1 **Beyond TCAS: Computer Assisted Air Traffic Control**

Jeffrey Young, IMSA

A working model of a computer-based system for assisting air traffic control has been designed and constructed. The model includes computer programs to pre-process the information necessary for air traffic control. The model did not operate faster than the present airspace control system. The author believes the model is more efficient than existing systems.

9:40 - 9:55 C1 **A Quantitative Description of Fluid Flow on the Molecular Level**

Mbuyi and Sanza Kazadi

A theoretical analysis of the boundary layer in laminar flow has been done. Basic mechanical principles are applied to the interaction between moving particles and a stationary surface. Key concepts used are the mean free path for the particles and completely (or partially) elastic collisions. Predictions are made for the pressure variation in the fluid, the drag force produced, and the velocity profile of the flow.

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Session AUD 2
Life Science Papers
Auditorium
10:00 - 10:55

10:00 - 10:20 A2 **Ionic Interactions in the Mechanism of the $(Na^+ + K^+)$ ATPase Pump**

Mehmet Guler, IMSA

It is hypothesized that the negatively charged phospholipids (phosphatidylserine and phosphatidylinsitol) which are found in the inner layer of the cell membranes of animal species, produce an electric field that affects the mobility of Na^+ and K^+ differently. It is believed that this difference in behavior which is caused by the electric field enables the $(Na^+ + K^+)$-ATPase to distinguish one cation from the other and consistently transport Na^+ outward and K^+ inward.

To determined the effects of an electric field on the mobility of Na^+ and K^+ the diffusion rates of NaCl and KCl are measured in a model cell both when an electric field is and is not present. In result, it is observed that while the diffusion rate of both Na^+/Cl^- (aq) and K^+/Cl^- (aq) are equal without the electric field, the diffusion rate of Na^+/Cl^- (aq) is greater than the diffusion rate of K^+/Cl^- (aq) in the presence of the electric field.

It is concluded that this difference in the diffusion rate is most likely due to the different effects of the electric field on the mobility of Na^+ and K^+. In light of these results, it is further believed that this phenomenon can be applied to a real cell, and with this, some unknown aspects of the mechanism of the $(Na^+ + K^+)$-ATPase pump can be explained.

10:25 - 10:55 B2 **Pterosaurian Terrestrial Locomotion**

Rowan Lockwood, IMSA

Controversy exists over pterosaurian terrestrial locomotion. This study examines a critical activity, terrestrial take-off, in Pteranodon ingens, a larger pterosaur. The ground clearance height is calculated, then the force, energy, and muscle mass required to generate a leap to this height. These results are comparable with known characteristics of Pteranodon and a comparable, the abatross Diomedea exulans. This methodology, matching a muscle requirement to a simulated effort, may be applied in other biomechanical simulations.

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Monday April 24, 1989

Session NLH 1
History Papers
New Lecture Hall
9:00 - 9:55

9:00 - 9:15 A1 **Migration in the Nineteenth Century Rural Denmark: The Case of Magleby Parish**

Christian Nokkentved, IMSA

In the 1800s, Europeans significantly expanded their migratory habits. A detailed analysis of local parish records reveal something of the nature of those migration patterns and their changes over time, as they relate to one locality. People moved in what might be called a migratory web; i.e. while some left, others arrived, and yet others moved about in the parish. The most significant changes between the 1830s and 1901 were the number of people crossing the parish boundary who a) came from or went to cities, and b) travelled long distances. In both cases there was a significant increase over time. A comparison of these results with the few other studies available suggest that these phenomena are not unique to Magleby Parish.

9:20 - 9:35 B1 **Liberal Dove Ideological Opposition to the Vietnam War: Were They Opposing the War for the Wrong Reason? A Revisionist Perspective**

Kenneth Guest, IMSA

This paper is concerned with historiographical debate over the origins and nature of American intervention in Southeast Asia. The Cardinal Revisionist tenet holds that Democratic Liberal Doves eventually called for alterations in Vietnam policy not because existing Vietnam policy was inherently immoral and violated the very best characteristics and beliefs in American society but because the Vietnamese model of interventionist foreign policy was too costy and ineffective. By examining the comments and analysis of the Liberal Dove opposition which finally urged major alterations in Vietnam policy; perhaps, it will be possible to test more accurately the basic Revisionist historiographical arguments, to reach a better understanding of the nature and purpose of the Liberal Dove opposition to the Vietnam War, and to contemplate what effects the nature of Liberal Dove opposition to the Vietnam War will have on future American foreign policy.

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Session NLH 1 continued

9:40 - 9:55 C1 **Baseball's Reserved Seat in the American Psyche**

Michael Hancock, IMSA

A study of baseball and its place in the mythos of America was conducted in an effort to discover why baseball is so important to so many people. A survey of baseball fiction and a review of academic musings on the game provided the background for a thorough examination of the sport known as America's "National Pastime." Traditional explanations of baseball's importance were rejected as being incomplete. However, more contemporary ideas, in conjunction with general views of the significance of sports in society, provide a more adequate interpretation of baseball and its meaning to millions of Americans.

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Session NHL 2
Physics Papers
New Lecture Hall
10:00 - 10:55

10:00 - 10:20 A2 **An Analysis of the Contact Bounce**

Alexander Lurie, Evanston Township High School

An investigation was done to analyze the phenomenon of the contact bounce of a mass-spring system. A simple model was created using two equal point masses that approach a hard wall. The masses are joined by a spring of constant K2, while a spring of constant K1 is attached to a mass that approaches the wall. For certain values of ß(K1/K2), the system rebounded and hit the wall a second time, producing a "double hit." Solving an eigenvalue problem, the critical value of ß for which the double hit occurred was found to be 3.89. More complex mass-spring systems were also investigated.

10:25 - 10:55 B2 **The Design and Testing of Aerofoils in a Wind Tunnel**

Gina Martyn, IMSA

I constructed a low-speed wind tunnel and used it to test the lift, drag, streamline, and stability of five shapes. Finding the best general form, I then designed four other aerofoil shapes based upon streamline using a computer program designed by Mr. J. Way. I created models using these four shapes and tested these four shapes and tested these aerofoils for lift, drag, and streamline in my wind tunnel. As a result, I was able to find a highly effective aerofoil. Construction of the wind tunnel and principles of aerodynamics will be discussed in the presentation.

Session AUD 3
Awards Ceremony
Auditorium
11:00 - 11:15

You can ask questions of the presenters at the end of the awards ceremony.